A DATA PROCESSOR CONTROLLED INTERACTIVE DOCUMENT EDITING DISPLAY SYSTEM WITH AN IMPLEMENTATION FOR SWAPPING THE POSITIONS OF TWO DESIGNATED SEGMENTS OF DATA IN A DISPLAYED DOCUMENT

Technical Field

5   The present invention relates to user interactive computer supported display technology and particularly to such user interactive word processing systems and methods that are user friendly and provide interactive users with 10   a display interface environment that is easy to use.

Background of Related Art

       The past decade has been marked by a technological revolution driven by the convergence of the data processing industry with the consumer electronics 15   industry. This advance has been even further accelerated by the extensive consumer and business involvement in the internet over the past few years. As a result of these changes, it seems as if virtually all aspects of human endeavor in the industrialized world requires human- 20   computer interfaces. There is a need to make computer directed activities accessible to a substantial portion of the world's population which, up to a few years ago, was computer-illiterate or, at best, computer indifferent. In order for the vast computer supported 25   market places to continue and be commercially productive, it will be necessary for a large segment of computer indifferent consumers to be involved in computer interfaces. There is one area where the computer controlled technology has made a tremendous advance in 30   productivity: word processing, where reliable textual output has been increased ten-fold. However, the word

processing technology continues to seek new expedients
that are user friendly to further enhance the speed and
reliability of this technology. The present invention
offers such a novel expedient.

Summary of the Present Invention

The present invention provides a user friendly
display interface that expedites the switching of
positions of a pair of sections with each other in a
displayed document which is being edited. The invention
involves means for defining one segment of displayed data
in a displayed document together with means for defining
another segment of displayed data in said displayed
document and means enabling a user to select to swap said
one segment with said another segment. There are means
responsive to such a user selection to swap for swapping
the positions of the defined segments of data with each
other. As an interactive aid to the user, the defined
sections may be highlighted. The defined sections of
data may be text; such as a phrase, a sentence, a
paragraph or a whole page or more. The defined sections
may also include images. While the embodiment that
follows illustrates the swapping in a word processing
system, it will be clear that the system, method and
programs described herein may be used for the swapping of
data sections in other documents; such as spread sheets
and other numerically arranged documents; computer
program listings and documents; as well as documents that
are primarily graphic in content.

Brief Description of the Drawings

The present invention will be better understood and
its numerous objects and advantages will become more

apparent to those skilled in the art by reference to the
following drawings, in conjunction with the accompanying
specification, in which:

    Fig. 1 is a block diagram of an interactive data
5   processor controlled display system including a central
processing unit that is capable of implementing the
present invention of swapping sections in a document
being edited;

    Fig. 2 is a diagrammatic starting view of a display
10 screen to illustrate the steps involved in the swapping
of phrases of text;

    Fig. 3 is the diagrammatic view of Fig. 2 after the
sections of text have been swapped;

    Fig. 4 is a diagrammatic starting view of a display
15 screen like that of Fig. 2 to illustrate the steps
involved in the swapping of paragraphs of text;

    Fig. 5 is the diagrammatic view of Fig. 4 after the
paragraphs of text have been swapped;

    Fig. 6 is a general flowchart of a program set up to
20 implement the present invention for swapping sections in
a displayed document being edited; and

    Fig. 7 is a flowchart of an illustrative run of a
program set up in accordance with the flowchart of
Fig. 6.

25 <u>Detailed Description of the Preferred Embodiment</u>
    Referring to Fig. 1, a typical generalized data
processing system display terminal is shown which may
function as the computer controlled display terminal used
for swapping sections in a document being edited. A
30 central processing unit (CPU) 10, such as any PC
microprocessor in a PC available from International
Business Machines Corporation (IBM) or Dell Corp., is

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provided and interconnected to various other components
by system bus 12. An operating system 41 runs on CPU 10,
provides control and is used to coordinate the function
of the various components of Fig. 1. Operating system 41
5   may be one of the commercially available operating
systems such as Microsoft's Windows98™ or WindowsNT™, as
well as the UNIX or AIX operating systems. An
application program that includes routines for defining
and swapping sections in a displayed document, to be
10   subsequently described in detail, runs in conjunction
with operating system 41 and provides output calls to the
operating system 41, which, in turn, implements the
various functions to be performed by the application 40.
A Read Only Memory (ROM) 16 is connected to CPU 10 via
15   bus 12 and includes the Basic Input/Output System (BIOS)
that controls the basic computer functions. Random
Access Memory (RAM) 14, I/O adapter 18 and communications
adapter 34 are also interconnected to system bus 12. It
should be noted that software components, including
20   operating system 41 and application 40, are loaded into
RAM 14, which is the computer system's main memory. I/O
adapter 18 may be a Small Computer System Interface
(SCSI) adapter that communicates with the disk storage
device 20, i.e. a hard drive. Communications adapter 34
25   interconnects bus 12 with an outside network enabling the
data processing system to communicate with other such
systems over a Local Area Network (LAN) or a Wide Area
Network (WAN), which includes, of course, the Internet or
World Wide Web (Web). I/O devices are also connected to
30   system bus 12 via user interface adapter 22 and display
adapter 36. Keyboard 24 and mouse 26 are all
interconnected to bus 12 through user interface adapter
22. Mouse 26 operates in a conventional manner insofar

as user movement is concerned. Display adapter 36
includes a frame buffer 39, which is a storage device
that holds a representation of each pixel on the display
screen 38. Images may be stored in frame buffer 39 for
5   display on monitor 38 through various components, such as
a digital to analog converter (not shown) and the like.
By using the aforementioned mouse or related devices, a
user is capable of inputting information to the system
through the keyboard 24 or mouse 26 and receiving output
10   information from the system via display 38.

　　　With reference to Fig. 2, the display screen 45 as
shown has a displayed text document 45 at the stage where
highlighted phrase 46 is ready to be swapped with
highlighted phrase 49. The document could have reached
15   this stage in several ways. One convenient approach,
after the user decides which sections he wishes to swap,
is for the user to first designate the section 46 that he
wishes to switch. This may be done by any standard word
processing technique for designating or blocking off a
20   section in the document, such as highlighting. The user
then finds the icon or item that designates the swap
function in the display interface screen. In the present
example, this is done by dropping down menu 47 which
includes "SWAP" item 48. After the user clicks on and,
25   thus, highlights item 48, he then designates section 49,
e.g. by highlighting the other section in the swap. The
user then completes the swap by an appropriate mouse
click or keyboard "Enter" to effect the swap shown in
Fig. 3, wherein phrases 49 and 46 have interchanged their
30   respective positions in the displayed document. For
convenience in ease of use of the interface, the swap
routine may maintain the highlighting of the swapped
sections for a brief period in the order of sections so

that the user may check as to whether his change is
appropriate.

     Figs. 4 and 5 illustrate the swapping of document
sections, i.e. paragraphs by a somewhat varied routine.

5   In this example, the "SWAP" 53 is located in the title
menu bar of the display. Here the swap may involve a
simple routine:

       Enable user to Select Swap;
       Click-on Swap Item 53;

10   Request User to Designate 54 First Section 50;
       Request User to Designate 55 Second Section 51;
       Activate the Swap.

The result of the Swap is shown in Fig. 5 where paragraph
51 has swapped positions with paragraph 50.

15   It should be understood that the swap function of
the present invention may be applied to the swapping of
words, phrases, sentences, paragraphs, pages or even
chapters in documents. Both alphanumeric text and images
may be included in the swapped sections.

20   While the swap function of this invention is simple
in its implementation, it is advantageous over other
known routines in word processing for changing the
positions of sections of data in word processing
displays. It is submitted to be more user friendly and

25   intuitive. Also, it eliminates steps over other word
processing routines. For example, it is simpler than the
routines for the "cut and paste" or "move" editing
functions. In the latter, which is probably simplest,
the user would have to designate, e.g. highlight the

30   first section, use the move function to move it into the
position of the second section and then similarly
designate and move the second section into the position
vacated by the moved first section.

Now, with reference to Figs. 6 and 7, we will
describe a process implemented by the present invention
in conjunction with the flowcharts of these figures.
Fig. 6 is a flowchart showing the development of a
5   process according to the present invention for swapping
the positions of sections in a displayed document to be
edited. A standard word processing operation is set up
on a data processor controlled user interactive display
interface, step 61. There is provision made for the
10   highlighting and, thereby, the designation of a first
section in a displayed word processing document, step 62.
A routine is provided for swapping the positions of a
pair of highlighted sections in the displayed document,
step 63. The user is enabled to select the swap routine
15   by clicking on an item or an icon in a displayed menu,
step 64. The designating by highlighting of a second
section of the displayed document is provided, step 65.
Finally, there is provision for the swapping of the
respective positions of the highlighted sections as
20   activated by the user, step 66.

An illustrative run of the process set up in Fig. 6
will now be described with respect to Fig. 7. First,
step 70, the document is displayed. A determination is
then made as to whether the user has highlighted a
25   section in the document, step 71. If No, the process is
returned to step 71 to await highlighting. If Yes, a
section is highlighted, then a further determination is
made as to whether the user has selected the Swap
function, step 72. If No, it is assumed that the section
30   was highlighted for some other word processing function,
and the process is branched back to step 71 where another
highlighting of another section is awaited. If the
determination from step 72 is Yes, the user has selected

the Swap function, then a further determination is made
as to whether the user has highlighted a second section,
step 73. If No, then the process is returned to step 73
where such highlighting is awaited. If the determination
5   in step 73 is Yes, the user has highlighted a second
section, then upon a confirmatory mouse click or enter by
the user, the positions of the first and second sections
are switched, step 74. At this point, a determination,
step 75, may conveniently be made as to whether the word
10   processing session with the particular document is at an
End. If Yes, the session is exited. If No, the process
is branched back to step 71 where another highlighting of
another section is awaited.

    The following is a set of typical pseudocode
15   statements for a Swap function.

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Enable a user to highlight a 1st block of data;
User highlights a 1st displayed block;
Store 1st block;
Enable user to select "Swap";
20        User selects Swap;
Prompt user to select 2nd block;
User selects 2nd block;
Store 2nd block;
User trigger, e.g. mouse click;
25        Swap displayed positions of the 1st and 2nd blocks.
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    One of the implementations of the present invention
is as an application program 40 made up of programming
steps or instructions resident in RAM 14, Fig. 1, during
computer operations. Until required by the computer
30   system, the program instructions may be stored in another
readable medium, e.g. in disk drive 20 or in a removable
memory such as an optical disk for use in a CD ROM
computer input or in a floppy disk for use in a floppy
disk drive computer input. Further, the program
35   instructions may be stored in the memory of another

computer prior to use in the system of the present invention and transmitted over a LAN or a WAN, such as the Internet, when required by the user of the present invention. One skilled in the art should appreciate that

5   the processes controlling the present invention are capable of being distributed in the form of computer readable media of a variety of forms.

Although certain preferred embodiments have been shown and described, it will be understood that many

10   changes and modifications may be made therein without departing from the scope and intent of the appended claims.